PORTLAND SERVICE CENTER
Resource Standards & Technology
Portland, Oregon

TECHNICAL NOTES

July 15, 1966

POLYETHYLENE LINER FOR PIT RESERVOIR INCLUDING TROUGH AND FENCING

As a result of the adoption through the Incentive Award Committee of an employee's suggestion, we are passing on to you information on the use of polyethylene for lining reservoirs to prevent excessive infiltration rates.

In the past years many materials have been tried with varying degrees of success to seal pervious earthen water storage structures. It has been found through various trials and experiments in the Idaho Falls District that black polyethylene plastic is an economical, desirable and effective liner for pit-type reservoirs and facings for small dams. A 6 mil material is the minimum recommendation for fine soils and 8 mil for coarse soils.

PURPOSE

Extend the use of rain and snow runoff water storage by stopping excessive ground seepage, provide clean livestock water by fencing. The fenced area can be used to develop desirable wildlife habitat.

ADAPTABILITY

Many pervious earthen structures may be improved through the use of lining with black polyethylene plastic. The facing of small dams as well as all reservoirs can be strengthened and water loss brought to a minimum by this lining. The plastic will last for many years when covered with soil.

CONSTRUCTION

After normal dam construction the following chronological steps should be taken:

1. Surface to be covered - smooth, large rocks (5" or larger) and all sharp rocks removed. If possible the area should be compacted to provide a good foundation for the plastic material.

2. Stock pile sufficient soil on the upper stream side of the area to cover the liner to the desired depth.

3. Start laying the plastic sheets (40' x 100') on the side closest to the stock piles, place 2 to 3 feet of each connecting sheet together and fold them twice, the first fold

Figure 1

one foot wide and the second fold the balance of the three feet (see drawing). Fold the edges away from the direction the soil will be rolled on.

Figure 2

4. Have two men stand on the outside edges of the plastic and roll the soil over the plastic with a dozer. Be sure to push enough soil with the dozer, 4 to 6 feet deep, so it will roll or spill on and not push the liner out of place. By maintaining 6 to 10 inches (fig. 1 & 2) in depth of soil, a tractor, cleat type, can roll all the soil on without puncturing the liner.

For unfenced areas a minimum of 12 inches of soil must be over the liner to prevent damage by animals. There are two lined reservoirs in the Idaho Falls District which have been operable for 7 years.

For fenced areas (fig. 3 and 4) the fill over the liner need not exceed 6 - 8 inches. Size of fenced area will depend upon

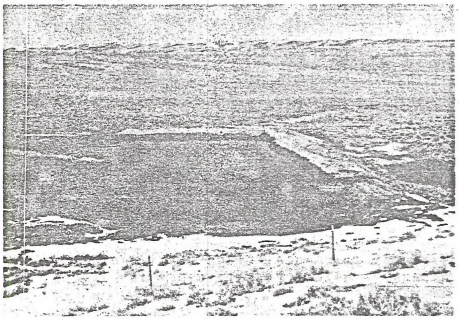


Figure 3

the various multiple use factors, such as upland game habitat, and recreation. Water should be piped a minimum of 600 feet from the fenced area.

Smaller sheets may be used, however, labor costs increase and more material is lost from lapping.

ADVANTAGES

1. Extend the use of rain and snow runoff water storage by stopping ground seepage.

2. Makes pervious soils usable.

T/N 185

3. Provides clean livestock and wildlife water.

4. Fenced areas provide good wildlife habitats.

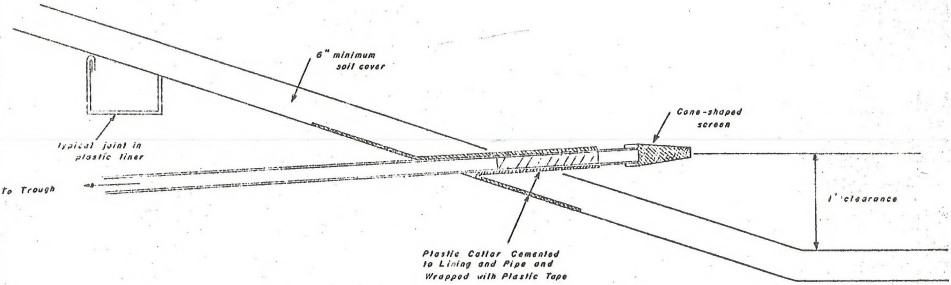
Figure 4

DISADVANTAGES

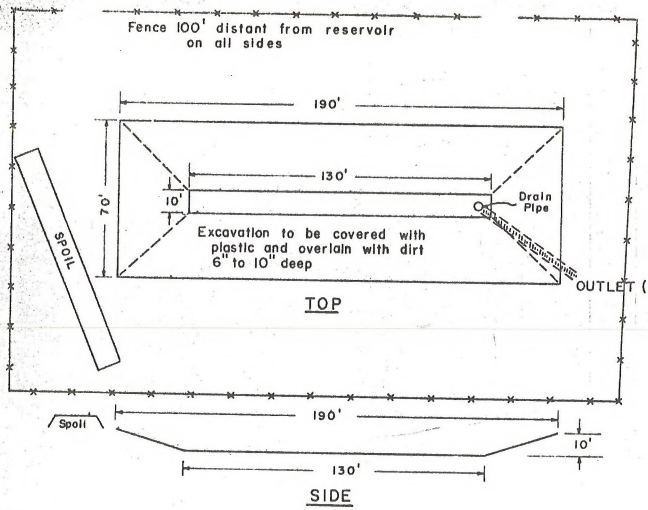
1. More costly than local clays but if not available, costs are comparable with bentonite depending upon hauling distance.

AVERAGE COST FIGURES (Idaho Falls, Idaho)

Black polyethylene plastic sheets, 40' x 100',6mil@43.00 - -	$129.00
3 Men, 5 days (15 man days)- - - - - - - - - - - - - - - - -	825.00
Heavy equipment, D-6 (15 hrs. @$4.00 /hr)- - - - - - - - -	120.00
Misc. costs, travel, telephone, etc. - - - - - - - - - - - -	100.00
Fencing, pipe & trough, seeding- - - - - - - - - - - - - - -	455.00
TOTAL	$1,629.



OUTLET PIPE DETAIL



INSTRUCTIONS

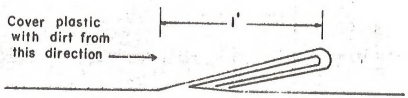
EXCAVATION— To the depth size as shown—smooth area and move all large rocks.

PLASTIC LINER— 1. Laid on top of excavation and joined by folding (see diagram) 2. Cover with 6" of dirt with a dragline DR 10" if covered with a crawler tractor.

SPOIL — Built from all materials not use to cover plastic.

OVERLAPPING PLASTIC SHEETS

NOT TO SCALE



SCALE 1" = 40'
SLOPE 3:1

U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Plastic Lined Stock Pond

DESIGNED C.E.W.	RECOMM.
DRAWN R.E.W.	RECOMM. CHIEF, DIV. OF ENG
CHECKED	APPROVED
SCALE N/A	
DATE 6-29-66	SHEET 1 OF 1
DRAWING NO.	